

Intercalibrating and Validating SAPHIR and ATMS Observations

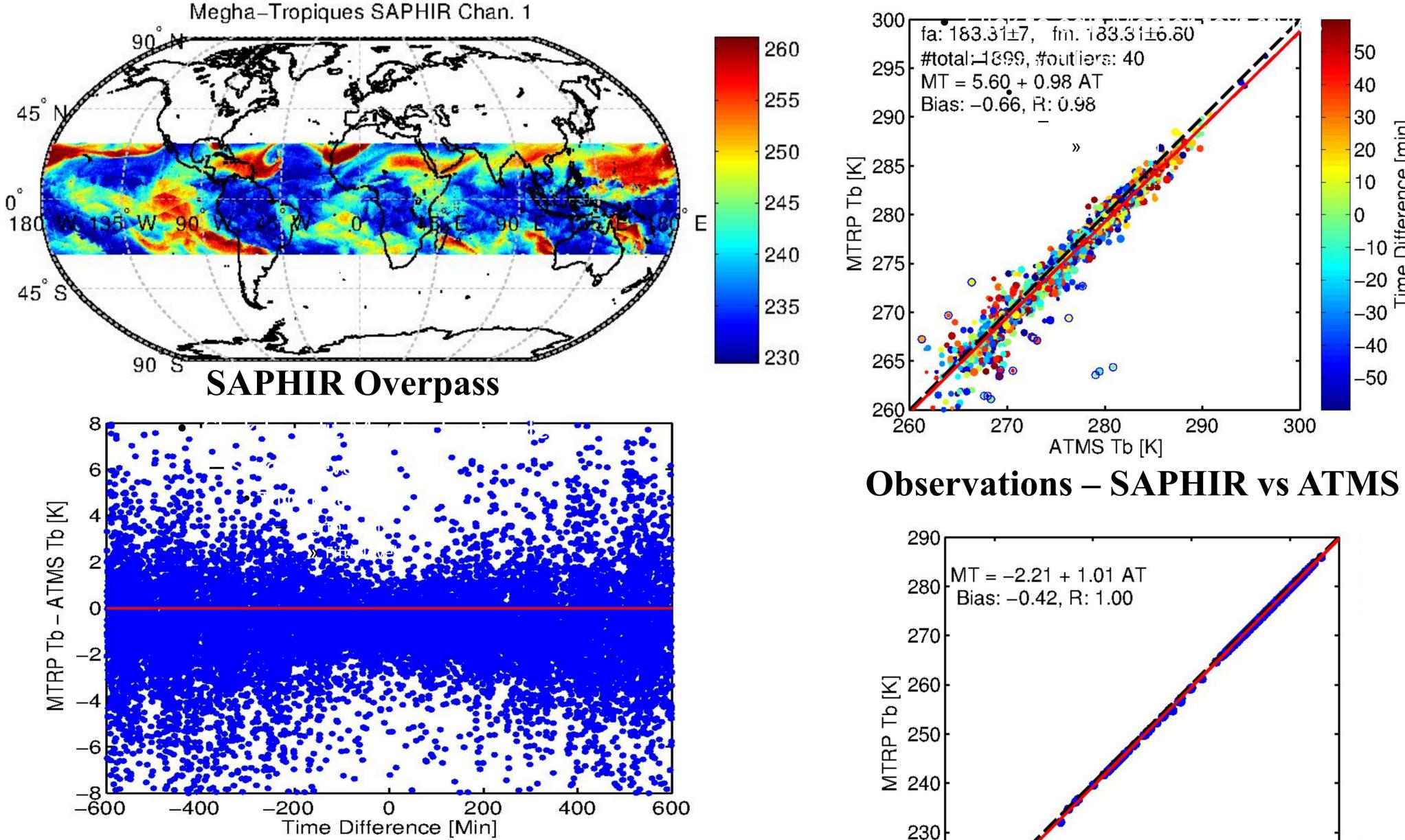
Isaac Moradi:: NOAA Joint Center for Satellite Data Assimilation (JCSDA), and ESSIC/CICS-MD, University of Maryland, College Park, MD 20740. Email: isaac.moradi@noaa.gov. Ralph Ferraro: NOAA/NESDIS/Center for Satellite Applications and Research, College Park, MD 20740



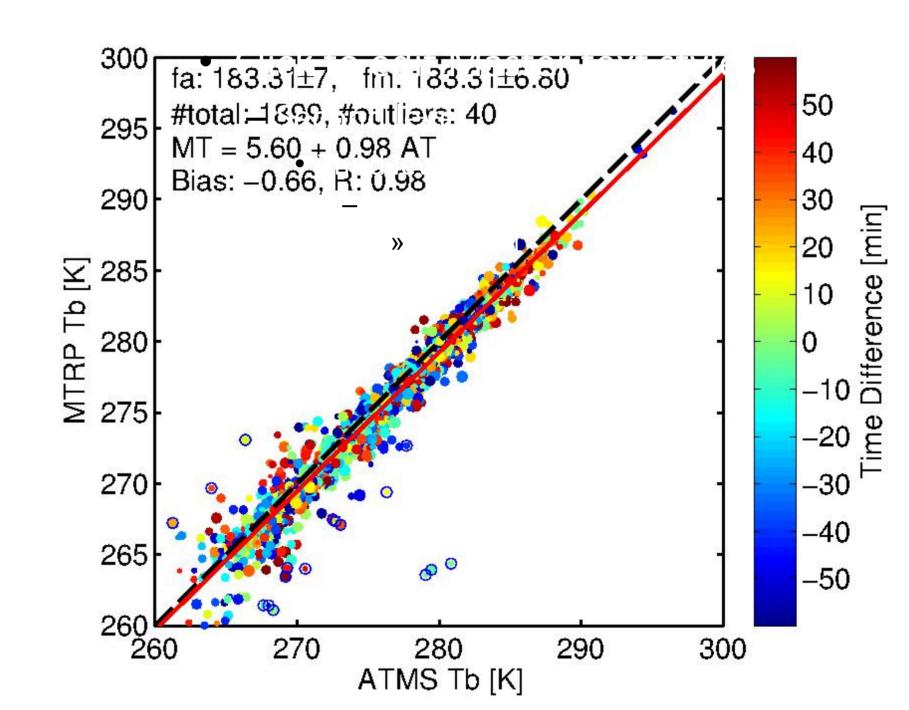
Abstract

Observations from modern microwave humidity sounders including SAPHIR onboard Megha-Tropiques and ATMS onboard Soumi NPP satellites are inter-compared and inter-calibrated. Observations from the two sensors were intercalibrated using simultaneous nadir observations during the period 2012-2013. Since NPP is a polar orbiting satellite but Megha-Tropiques is a lowinclination satellite, enough coincident observations cane be collected in a short period of time. In addition, the satellite observations were validated against high-quality radiosonde data from the ARM program as well as GPS-RO observations. The results show that the observations from the two sensors are in good agreement with each other as well as with the simulated radiances from radiosonde and GPS-RO observations

Inter-comparing ATMS and SAPHIR



Difference between observations as a function of the time difference



MT = -2.21 + 1.01 ATBias: -0.42, R: 1.00 230 220 240 260

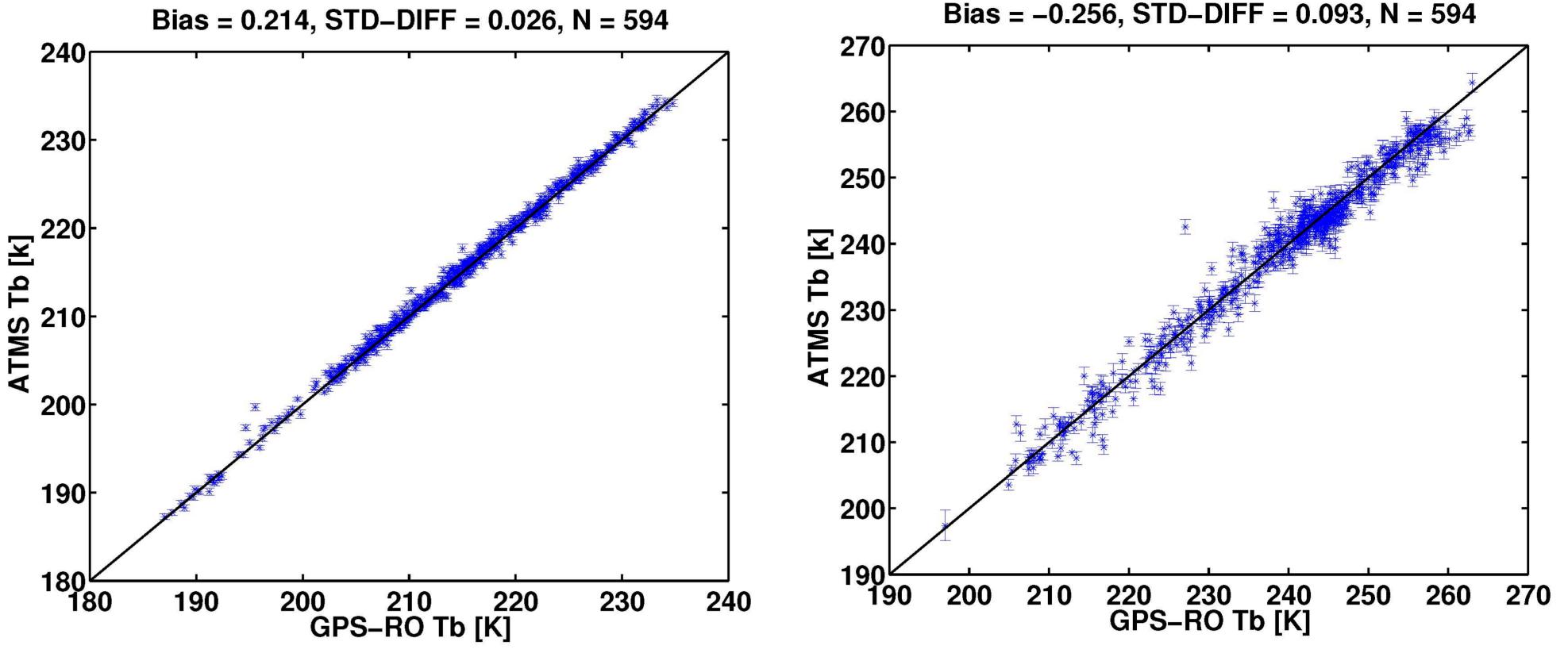
Simulations – SAPHIR vs ATMS

ATMS Tb [K]

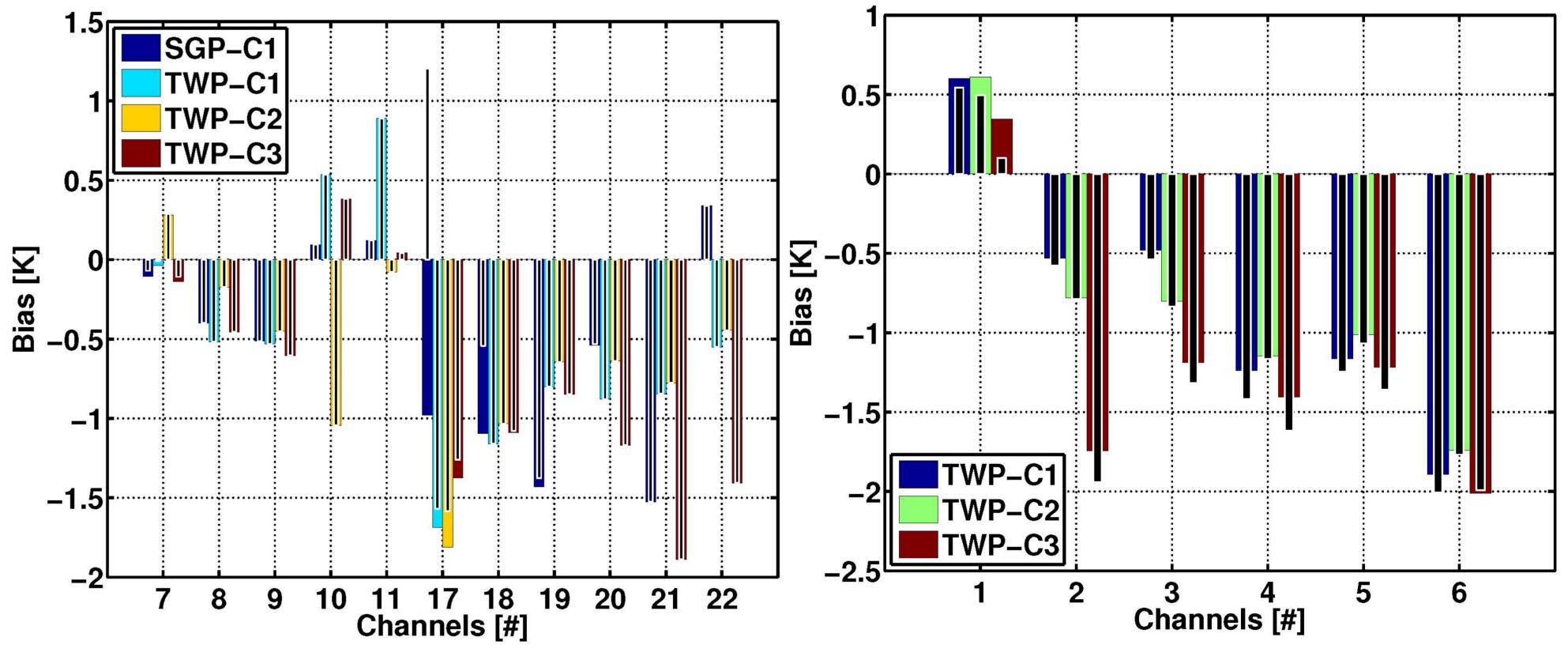
ATMS	SAPHIR	Bias (Obs)	Bias (Sim)	Obs - Sim
183 ± 7.0	183 ± 6.8	-0.68	-0.42	-0.26
183 ± 4.5	183 ± 4.2	-1.56	-0.91	-0.65
183 ± 3.0	183 ± 2.8	-1.23	-0.93	-0.30
183 ± 1.0	183 ± 1.1	+0.42	+0.90	-0.48

Double difference: observations minus simulations

Validation vs. Radiosonde and GPS



Observations from the ATMS UTLS temperature sounding channels versus GPS-RO simulated TB (left: channel 10, right: channel 14)



ATMS and SAPHIR observations versus brightness temperatures simulated using ARM radiosonde data

Summary

- A) Observations from the ATMS and SAPHIR WV sounding channels are in good agreement
- B) Observations from both ATMS and SAPHIR are in good agreement with the simulated Tbs from both radiosonde and GPS-RO observations. Some of the stratospheric channels show a larger bias in compare to GPS data (not shown) that can be due to RT calculations. This is still under investigation.
- C) Permanent monitoring of satellite observations is essential to maintain the quality that is required for weather and climate applications